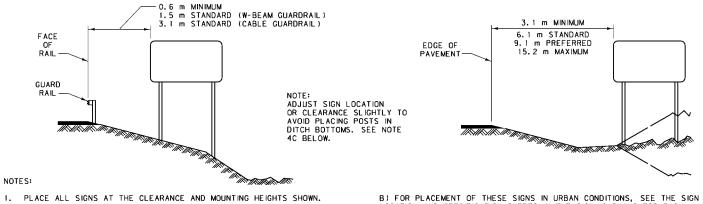


GUIDE SIGNS



- 1. PLACE ALL SIGNS AT THE CLEARANCE AND MOUNTING HEIGHTS SHOWN.
- FOR REGULATORY, WARNING AND ROUTE MARKER SIGNS, AND THEIR ASSEMBLIES, ON HIGHWAYS OTHER THAN INTERSTATE:

  A) USE DIAGRAMS LOCATED IN COLUMN () WHEN PLACING THESE SIGNS IN STANDARD RURAL CONDITIONS. USE COLUMN () WHEN PLACING THESE SIGNS BEHIND GUARDRAIL IN RURAL CONDITIONS. USE COLUMN () WHEN PLACING THESE SIGNS IN URBAN CONDITIONS WHERE THERE IS ADEQUATE CLEARANCE AND SIDEWALK WIDTH.

  B) WHERE SIDEWALK WIDTH IS LIMITED IN URBAN CONDITIONS, SEE DTL.

  DWG. NO. 619-18 FOR PLACEMENT DETAILS.
- FOR REGULATORY (ALL OTHER), WARNING AND ROUTE MARKER SIGNS, AND THEIR ASSEMBLIES, ON INTERSTATE HIGHWAYS:
  THE CLEARANCE IS 6.1 m FROM THE EDGE OF PAVEMENT IN COLUMN ()
  FOR STANDARD RURAL CONDITIONS. THE CLEARANCES LISTED IN COLUMNS (2) AND (3) REMAIN AS SHOWN.
- 4. FOR GUIDE SIGNS AND THEIR ASSEMBLIES:
  A) USE THE DIAGRAMS LOCATED ABOVE WHEN PLACING THESE SIGNS IN THE GIVEN RURAL CONDITIONS.

- B) FOR PLACEMENT OF THESE SIGNS IN URBAN CONDITIONS, SEE THE SIGN LOCATION AND SPECIFICATION SHEETS IN THE SIGNING PLANS FOR EACH INDIVIDUAL SIGN. INDIVIDUAL SION.

  C) THE MAXIMUM CLEARANCE OF THESE SIGNS IS 15.2 m IN ANY CONDITION.

  D) SEE DTL. DWG. NO. 619-08 FOR MOUNTING HEIGHTS.
- WITHIN THE CITY LIMITS OR IN A SIDEWALK AND CURB AREA, MOUNT SIGNS TO HAVE THE PROPER CLEARANCES, BUT AVOID ANY CONFLICT BETWEEN THE POST AND THE MAIN WALKING AREA OF THE SIDEWALK, OR WITH DOORWAYS OR WINDOWS OF ADJACENT BUILDINGS. THE EXACT LOCATION OF THESE SIGN INSTALLATIONS WILL BE DETERMINED BY THE ENGINEER. SEE
- DTL. DWG. NO. 619-18 FOR VARIOUS CANTILEVER TYPE MOUNTINGS. EVALUATE SIGNS WITHIN CLEAR ZONES (TABLES BELOW) FOR SUPPORT BREAKAWAY REQUIREMENTS (CONTACT MDT TRAFFIC SECTION FOR CRITERIA).

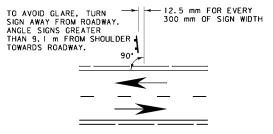
# CLEAR ZONE DISTANCES (IN METERS FROM EDGE OF DRIVING LANE)

			FILL SLOPES			CUT SLOPES	
DESIGN SPEED	DESIGN ADT	6: 1 OR FLATTER	5: 1 TO 4: 1	3: 1	3: 1	4:1 TO 5:1	6:1 OR FLATTER
	UNDER 750	2.0-3.0	2.0-3.0	**	2.0-3.0	2.0-3.0	2.0-3.0
60 km/h	750-1499	3.0-3.5	3.5-4.5	**	3.0-3.5	3.0-3.5	3.0-3.5
OR LESS	1500-6000	3.5-4.5	4.5-5.0	**	3.5-4.5	3.5-4.5	3.5-4.5
	OVER 6000	4.5-5.0	5.0-5.5	**	4.5-5.0	4.5-5.0	4,5-5.0
	UNDER 750	3.0-3.5	3.5-4.5	**	2.5-3.0	2.5-3.0	3.0-3.5
70-80	750-1499	4.5-5.0	5.0-6.0	**	3.0-3.5	3.5-4.5	4.5-5.0
km/h	1500-6000	5.0-5.5	6.0-8.0	**	3.5-4.5	4.5-5.0	5.0-5.5
	OVER 6000	6.0-6.5	7.5-8.5	**	4.5-5.0	5.5-6.0	6.0-6.5
	UNDER 750	3.5-4.5	4.5-5.5	**	2.5-3.0	3.0-3.5	3.0-3.5
90	750-1499	5.0-5.5	6.0-7.5	**	3.0-3.5	4.5-5.0	5.0-5.5
km/h	1500-6000	6.0-6.5	7.5-9.0	**	4.5-5.0	5.0-5.5	6.0-6.5
	OVER 6000	6.5-7.5	8.0-10.0 *	**	5.0-5.5	6.0-6.5	6.5-7.5
	UNDER 750	5.0-5.5	6.0-7.5	**	3.0-3.5	3.5-4.5	4.5-5.0
100	750-1499	6.0-7.5	8.0-10.0 *	**	3.5-4.5	5.0-5.5	6.0-6.5
km/h	1500-6000	8.0-9.0	10.0-12.0 *	**	4.5-5.5	5.5-6.5	7.5-8.0
	OVER 6000	9.0-10.0 *	11.0-13.5 *	**	6.0-6.5	7.5-8.0	8.0-8.5
	UNDER 750	5.5-6.0	6.0-8.0	**	3.0-3.5	4.5-5.0	4.5-4.9
110	750-1499	7.5-8.0	8.5-11.0 *	**	3.5-5.0	5.5-6.0	6.0-6.5
km/h	1500-6000	8.5-10.0 *	10.5-13.0 *	**	5.0-6.0	6.5-7.5	8.0-8.5
	OVER 6000	9.0-10.5 *	11.5-14.0 *	**	6.5-7.5	8.0-9.0	8.5-9.0

- \* WHEN AN INVESTIGATION OR ACCIDENT HISTORY INDICATES WHEN AN INVESTIGATION OF ACCIDENT HISTORY INDICATES
  A HIGH PROBABLITY OF ACCIDENTS, CLEAR ZONE DISTANCES
  GREATER THAN 9 m MAY BE PROVIDED AS INDICATED. CLEAR
  ZONES MAY ALSO BE LIMITED TO 9 m TO PROVIDE A
  CONSISTENT ROADWAY TEMPLATE WHEN EXPERIENCE WITH
  PREVIOUS SIMILAR PROJECTS INDICATES SATISFACTORY
- \*\*\* FIXED OBJECTS, INCLUDING SIGN POSTS, SHOULD NOT BE ALLOWED IN THE VICINITY OF THE TOE OF THESE SLOPES. SEE AASHTO ROADSIDE DESIGN GUIDE FOR ADDITIONAL CONSIDERATIONS IN LOCATING SIGNS.

## HORIZONTAL CURVE ADJUSTMENTS (APPLICALBLE ON OUTSIDE OF CURVE ONLY)

RADIUS		DE:	SIGN SPE	ED (km/	/h )	
(m)	60	70	80	90	100	110
900	1.1	1, 1	1, 1	1.2	1.2	1.2
700	1.1	1, 1	1.2	1.2	1.2	1.3
600	1.1	1.2	1.2	1.2	1.3	1.4
500	1.1	1,2	1,2	1.3	1.3	1, 4
450	1.2	1.2	1.3	1.3	1.4	1.5
400	1.2	1.2	1.3	1.3	1.4	
350	1.2	1.2	1.3	1,4	1.5	
300	1.2	1.3	1.4	1.5	1.5	
250	1.3	1, 3	1,4	1.5		
200	1.3	1.4	1.5			
150	1.4	1.5				
100	1.5					

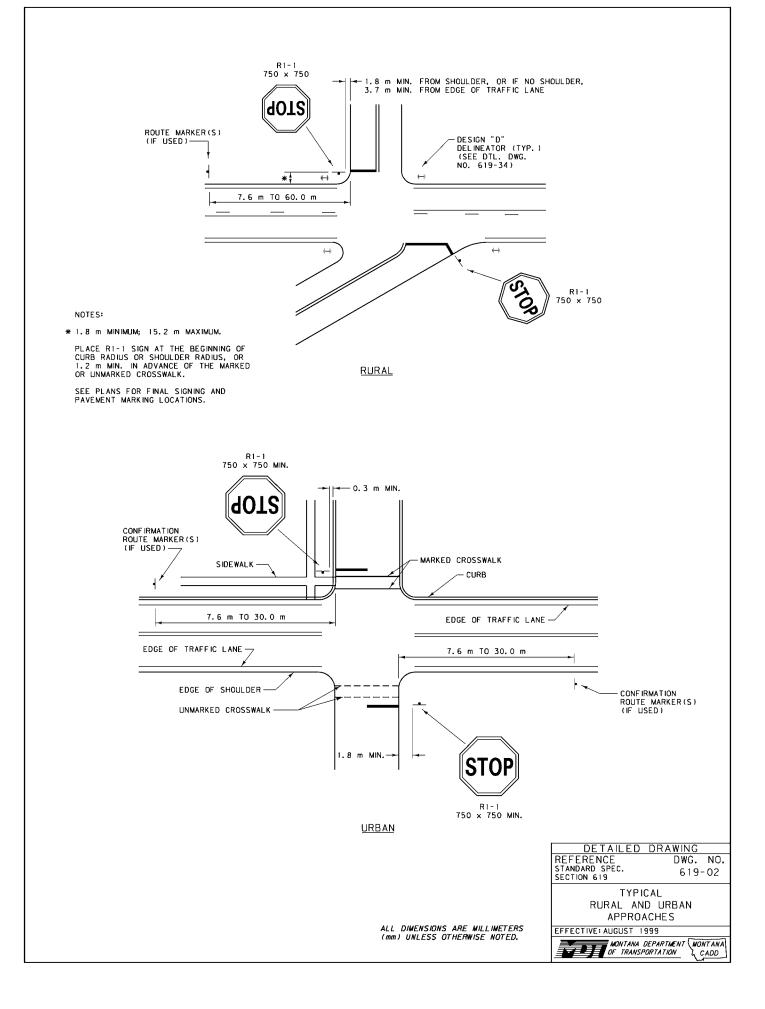


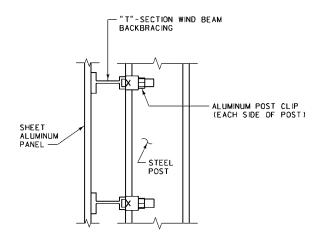
SKEW DIAGRAM

DETAILED	DRAWING				
REFERENCE	DWG.	NO.			
REFERENCE STANDARD SPEC. SECTION 619	619-00				
SIGN CLEAR.		ı			

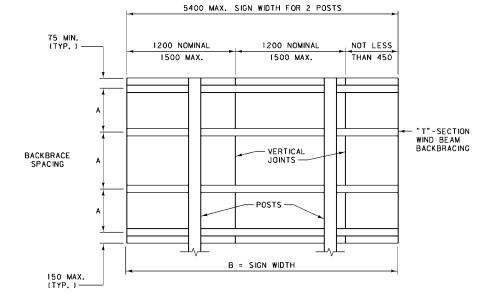
EFFECTIVE: JANUARY 2004

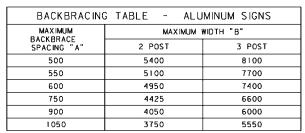




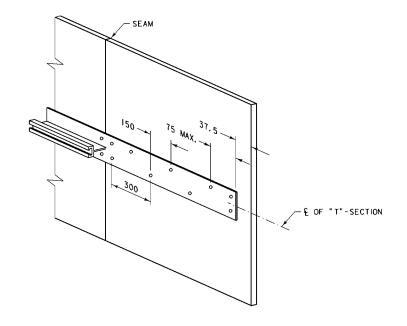


BACKBRACE DETAIL





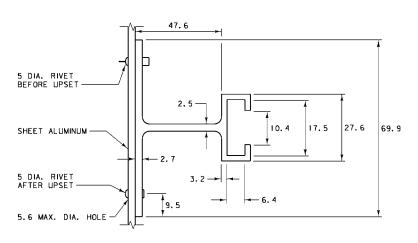
FOR ALUMINUM PLATE THICKNESS INFORMATION SEE SECTION 704.01 OF THE STANDARD SPECIFICATIONS.



# RIVET SPACING DETAIL LOCATE RIVETS AT 150 mm ALTERNATE CENTERS ON HORIZONTAL EXTRUDED "T"-SECTION.

DOUBLE RIVETS (TOP AND BOTTOM OR LEFT AND RIGHT OF EXTRUDED "T"-SECTION) AT HORIZONTAL AND VERTICAL JOINTS IN SHEET ALUMINUM FACE AND AT ENDS OF EXTRUDED "T"-SECTION.

COLOR RIVET HEADS TO MATCH ADJACENT SHEETING.



EXTRUDED "T"-SECTION BACKBRACE

### IOTES:

CONFORM ALL ALUMINUM SIGNS TO SECTIONS 619, 704.01.1 AND 704.01.2 OF THE STANDARD SPECIFICATIONS.

FOR SIGNS 1200 mm HIGH BY 1800 mm LONG OR LESS USE A SINGLE SHEET OF ALUMINUM.

DO NOT USE HORIZONTAL JOINTS ON SIGNS 1800 mm IN HEIGHT AND SMALLER. THE MINIMUM SHEET WIDTH IS 450 mm.

SIGNS OVER 1800 mm HIGH MAY HAVE HORIZONTAL AND VERTICAL JOINTS. THE MINIMUM SHEET SIZE IS 450 mm WIDE BY 450 mm HIGH.

CLEAN AND DRY POST CLIP NUTS, THEN TORQUE TO 25.4 N·m.

LOCATE ALL HORIZONTAL JOINTS AT A "T"-SECTION.

NO SPLICES ARE ALLOWED IN EXTRUDED "T"-SECTIONS.

USE SCREWS, BOLTS AND LOCKWASHERS THAT ARE ALUMINUM ALLOY MEETING ASTM B 211M FOR ALLOY 2024-T4, STAINLESS STEEL, OR CADMIUM PLATED STEEL MEETING ASTM B 766.

USE ONLY ALUMINUM RIVETS

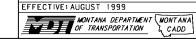
THE MAXIMUM GAP BETWEEN INDIVIDUAL SIGN PANELS AT JOINTS IS 1.6 mm AT ANY POINT.

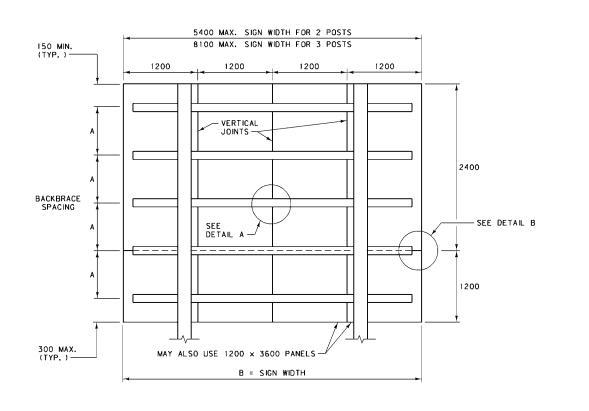
THE ENGINEER MAY APPROVE ADDITIONAL METHODS TO PREVENT LIGHT LEAKAGE THROUGH SIGN PANEL SEAMS.

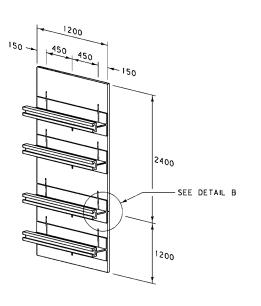
DETAILED DRAWING
REFERENCE DWG. NO.
STANDARD SPEC. 619-04

ALUMINUM SHEET INCREMENT SIGN CONSTRUCTION DETAILS

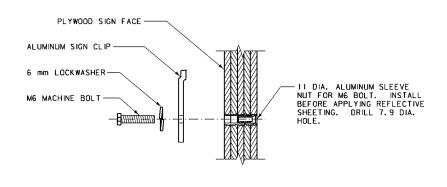
ALL DIMENSIONS ARE MILLIMETERS (mm) UNLESS OTHERWISE NOTED.





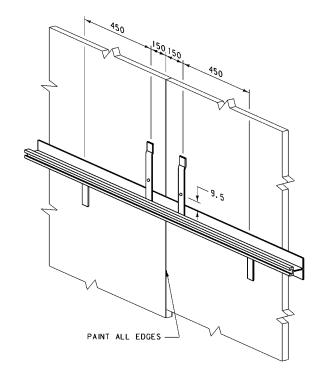




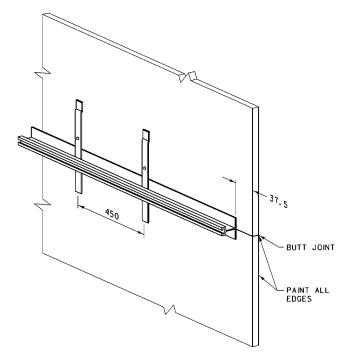


CLIP DETAIL

BACKBRACING	G TABLE - PL	YWOOD SIGNS						
MAXIMUM BACKBRACE	MAXIMUM	MAXIMUM WIDTH "B"						
SPACING "A"	2 POST	3 POST						
500	5400	8100						
550	5100	7700						
600	4950	7400						
750	4425	6600						
900	4050	6000						
1050	3750	5550						







DETAIL B

CONFORM ALL PLYWOOD SIGNS TO SECTIONS 619, 704.01.3 AND 704.02.2 OF THE STANDARD SPECIFICATIONS.

ON SIGNS 1200 mm HIGH AND GREATER, DO NOT USE ANY PANELS LESS THAN 1200 mm IN HEIGHT.

DO NOT USE HORIZONTAL JOINTS ON SIGNS LESS THAN 1200 mm

FOR SIGNS WITH WIDTHS THAT ARE NOT IN MULTIPLES OF 1200 mm, PLACE THE ODD LENGTH PANEL ON THE INSIDE EDGE.

FOR SIGNS OVER 3000 mm IN HEIGHT, THE FULL HEIGHT MAY BE OBTAINED WITH PANELS HAVING A FACTORY SCARFED JOINT IN LIEU OF USING STANDARD LENGTH PANEL AS SHOWN.

THE MINIMUM SIZE PANEL IS 450 mm WIDE BY 1200 mm HIGH.

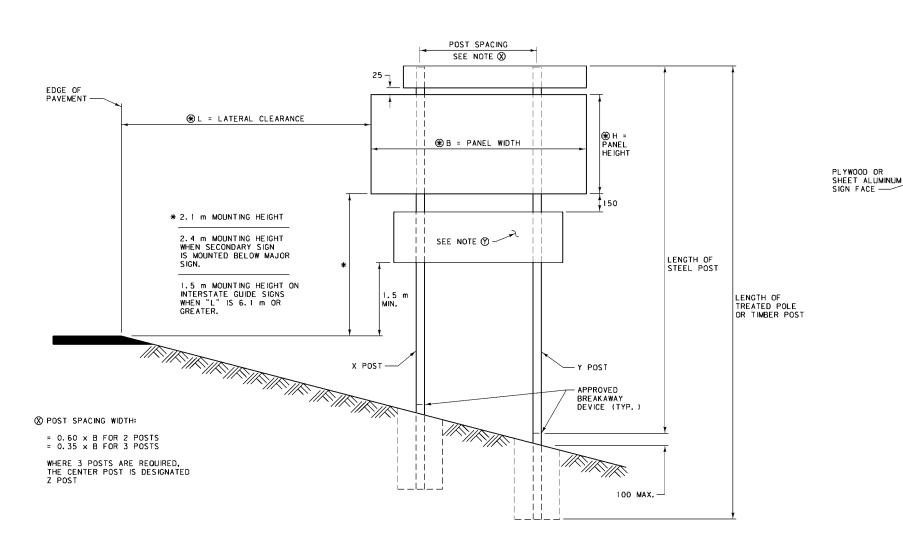
CONSTRUCT PLYWOOD SIGNS OF ONE PIECE OF PLYWOOD UNLESS THE PLANS SPECIFY OTHERWISE FOR SPECIAL DESIGN SIGNS.

ALL DIMENSIONS ARE MILLIMETERS (mm) UNLESS OTHERWISE NOTED.

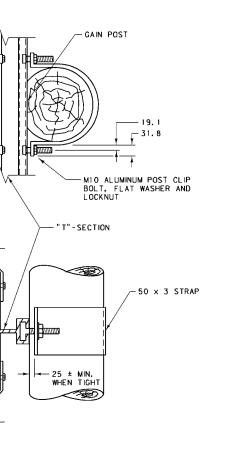
DETAILED DRAWING
REFERENCE DWG.
STANDARD SPEC. 619 DWG. NO. 619-06 SECTION 619, 704

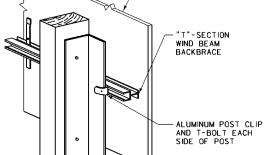
PLYWOOD SHEET INCREMENT GUIDE SIGN CONSTRUCTION DETAILS





# MOUNTING DETAILS





-"T"-SECTION WIND BEAM BACKBRACE

-ALUMINUM POST CLIP AND T-BOLT EACH SIDE OF POST

SHEET ALUMINUM OR PLYWOOD

-64 x 89 x 7.9 x 200 L EACH SIDE OF POST

TREATED POLE

MOUNTING SYSTEMS SHOWN ARE TYPICAL. OTHER SYSTEMS MAY BE APPROVED

ALL STEEL HARDWARE MUST BE GALVANIZED, STAINLESS, OR CADMIUM PLATED. GAIN THE TOP HALF OF WOOD POLES ACCORDING TO THE TABLE ON DTL. DWG. NO. 619-20.

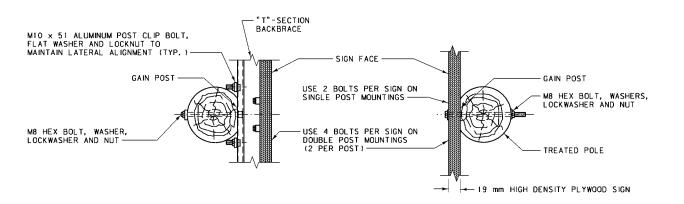
SEE THE SIGNING QUANTITIES FOR THE TYPES OF POSTS AND FOUNDATIONS.

MOUNT ONE-PANEL PLYWOOD SIGNS DIRECTLY TO WOOD POLES OR POSTS, WHEN SPECIFIED IN THE PLANS, BY BOLTING THROUGH THE SIGN PLATE AND THE POLE WITH CADMIUM PLATED BOLTS AS REQUIRED BY THE DETAILED DRAWINGS, SPECIFICATIONS AND DESIGN. USE "T"-SECTION WIND BEAMS WHEN REQUIRED

USE POST SPACING, POST SIZE AND BREAKAWAY DEVICES SPECIFIED IN THE PLANS AND IN THE SPECIFICATIONS. FOR INFORMATION REGARDING APPROPRIATE BREAKAWAY DEVICES FOR NEW INSTALLATIONS NOT SUPPORTED BY THE PLANS, CONTACT THE TRAFFIC UNIT.

IN LOCATING SIGNS, AVOID PLACING POSTS IN DITCH BOTTOMS WHERE THEY WOULD IMPEDE DRAINAGE.

\* DIMENSIONS ARE SPECIFIED IN THE SIGNING PLANS.



DOUBLE POLE MOUNT

TREATED POLE SINGLE OR DOUBLE (USED WHEN "T"-BAR WIND BEAMS NOT REQUIRED) TREATED TIMBER POST

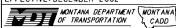
STEEL POST

ALL DIMENSIONS ARE MILLIMETERS (mm) UNLESS OTHERWISE NOTED.

DETAILED DRAWING REFERENCE STANDARD SPEC DWG. NO. SECTION 619, 704

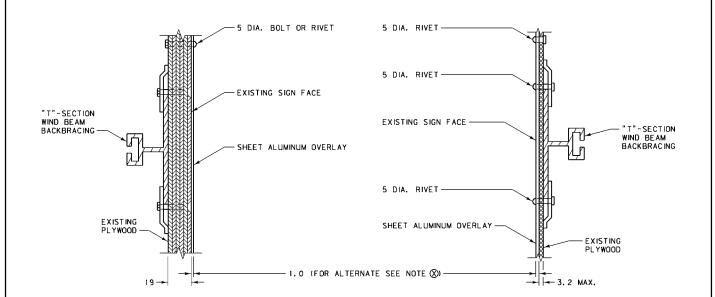
> GUIDE SIGN CLEARANCE AND MOUNTING DETAILS

FFECTIVE: DECEMBER 2002



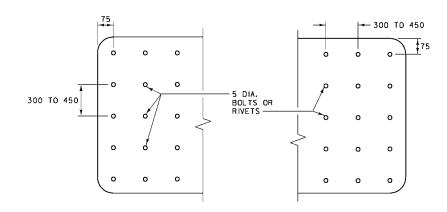


619-08



# EXISTING PLYWOOD SIGNS

# EXISTING ALUMINUM SIGNS



# FASTENER PATTERN

# NOTES:

REMOVE ALL RAISED LETTERS, NUMERALS, SYMBOLS, BORDERS AND PREVIOUS SIGN OVERLAYS TO BE REPLACED, AND CLEAN SIGN FACE TO A SMOOTH SURFACE BEFORE OVERLAYING.

ALL LETTERS, NUMERALS, SYMBOLS AND BORDERS ARE TYPE "C" CUTOUT UNLESS OTHERWISE SPECIFIED, AND APPLIED TO THE BACK-GROUND SHEETING PRIOR TO FIELD APPLICATION OF THE SIGN.

THE SIZE OF ALL GUIDE SIGN OVERLAYS AND LEGENDS MUST BE VERIFIED BY THE ENGINEER PRIOR TO FABRICATION.

PROVIDE A MINIMUM REFLECTIVE SHEETING INTENSITY OF ENGINEERING GRADE, MEETING THE REQUIREMENTS OF THE STANDARD SPECIFICATIONS, UNLESS SPECIFIED OTHERWISE.

APPLY ALL MATERIALS IN ACCORDANCE WITH THE MANUFACTURER'S SPECIFICATIONS AND RECOMMENDATIONS.

SEE THE STANDARD SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.

USE ALUMINUM ALLOY TYPE 6061-T6 OR AA5052-H38. CONVERSION COAT ALL ALUMINUM WITH A PROCESS SUCH AS ALODINE 1200 (OR EQUAL), AND RINSE AND DRY THOROUGHLY. PROTECT IT FROM SOIL BY ACCEPTABLE METHODS.

SIGN OVERLAYS MAY REQUIRE REMOVAL OF THE SIGN FROM THE POSTS TO AVOID PROJECTING BOLT HEADS. DO NOT LEAVE WARNING AND REGULATORY SIGNS TO BE OVERLAYED UNDISPLAYED FOR MORE THAN ONE (1) HOUR DURING DAYLIGHT. DO NOT LEAVE GUIDE SIGNS UNDISPLAYED FOR MORE THAN TEN (10) HOURS DURING DAYLIGHT. INSURE SIGNS TO BE OVERLAYED ARE OPERATIONAL PRIOR TO DARKNESS.

OVERLAY SIGNS SMALLER THAN 1200 mm x 1800 mm WITH ONE PANEL OF MATERIAL. FOR SEAMS IN LARGE OVERLAYS, USE RIVETS OR BOLTS SPACED AS SHOWN ON THIS DRAWING AND PLACE PARALLEL TO AND NO MORE THAN 75 mm LATERALLY FROM THE SEAM.

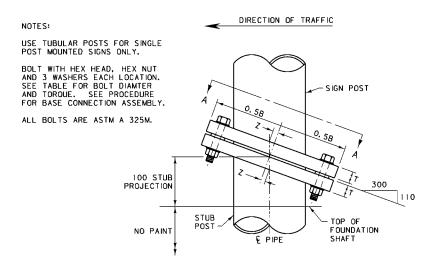
DETAILED DRAWING
REFERENCE DWG. NO.
STANDARD SPEC. 619-10

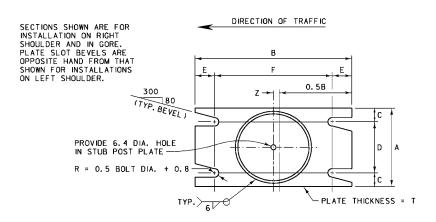
SHEET ALUMINUM OVERLAY

IMETERS EFFECTIVE: AUGUST 1999



ALL DIMENSIONS ARE MILLIMETERS (mm) UNLESS OTHERWISE NOTED.





SECTION A-A BASE PLATE DETAIL

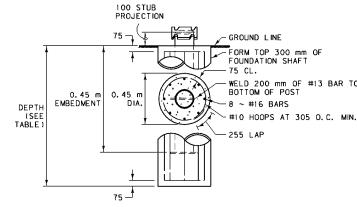
# LENGTH OF POSTS SHOWN IN SIGN LOCATION AND POST CLIP SPECIFICATIONS 51 x 51 x 6.4 MOUNTING ANGLE BREAKAWAY GROUND LINE DEVICE

TYPICAL SIGN ELEVATION FOR DETAILS OF MOUNTING ANGLES SEE DETAILED DRAWING NUMBER 619-16 AND BELOW.

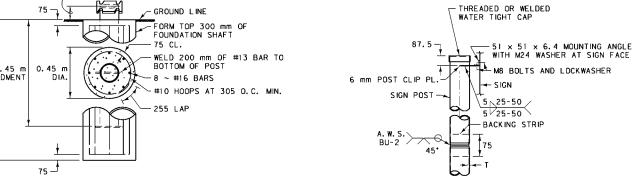
# SIGN POST AND STUB POST DETAILS

PROCEDURE FOR BASE CONNECTION ASSEMBLY

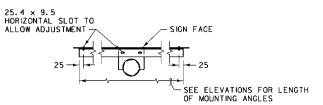
- I. ASSEMBLE POST TO STUB WITH BOLTS AND ONE FLAT WASHER BETWEEN PLATES.
- 2. SHIM AS REQUIRED TO PLUMB POST.
- TIGHTEN BOLTS IN A SYSTEMATIC ORDER TO THE PRESCRIBED TORQUE (SEE TABLE BELOW).
- 4. LOOSEN EACH BOLT AND RETIGHTEN TO PRESCRIBED TORQUE IN THE SAME ORDER AS ORIGINAL TIGHTENING. DO NOT OVERTIGHTEN.
- 5. BURR THREADS AT JUNCTION WITH NUT USING A CENTER PUNCH TO PREVENT NUT LOOSENING.

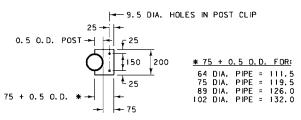


FOUNDATION SHAFT DETAIL



TYPICAL SPLICE BACKING STRIP THICKNESS = T OR 8 mm MAX. LOCATE SPLICE IN TOP ONE-HALF OF POST.

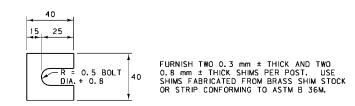




POST CLIP DETAILS

	L-	В			
	E	F	E E		
-	· - <del>-</del>			tc	-
				D	Α
R = 0.5 BOLT DIA. + 0.8	<del></del> 0		ф		
28 GAGE (0.5	THK.) GALVA	ANIZED STEE	L		

KEEPER PLATE DETAIL



SHIM DETAIL

	BASE CONNECTION DATA											
NOMINAL PIPE DIA.	BOL T SIZE	BOL T TORQUE	Α	В	С	D	E	F	Т	Z	FOOTING DIAMETER	FOOTING DEPTH
75	M12 × 63	27 N·m	115	190	25.8	63.4	19.1	151.8	19	8	0.45 m	0.9 m
89 & 102	M12 × 63	27 N·m	140	215	25.6	88.8	18.6	177.8	19	8	0.45 m	0.9 m
127	M16 × 83	54 N·m	165	250	31.7	101.6	23.4	203.2	25	10	0.45 m	1.2 m
152	M20 × 89	88 N·m	190	285	31.5	127.0	25.0	235.0	25	10	0.45 m	1.4 m

USE STEEL PIPE CONFORMING TO THE REQUIREMENTS OF ASTM A 53, TYPE E OR S, GRADE B OR A 500, GRADE B.

USE CLASS "A" OR "D" CONCRETE WITH A WOOD FLOAT FINISH ON TOP. FORM TOP 300 mm OF FOUNDATION.

SEE THE STANDARD SPECIFICATIONS FOR REQUIREMENTS GOVERNING STRUCTURAL STEELS AND THEIR FABRICATION.

SUBMIT SHOP PLANS FOR APPROVAL PRIOR TO FABRICATION.

FOR SIGN PLACEMENT AND DETAILS SEE THE SIGNING DETAILED

GALVANIZE PIPE AS PER AASHTO M 111.

EXCEPT AS OTHERWISE APPROVED BY THE ENGINEER, PAINT STRUCTURAL STEEL WITH ONE SHOP COAT AND ONE FIELD COAT OF ZINC RICH BASED PAINT AND ONE FIELD COAT OF ALUMINUM PAINT AS SPECIFIED IN THE STANDARD SPECIFICATIONS, ON ALL SURFACES NOT IN CONTACT WITH THE CONCRETE.

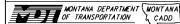
FRANGIBLE BOLT BREAKAWAY SYSTEMS APPROVED BY FHWA ARE ALLOWED TO BE USED IN PLACE OF THE DESIGN SHOWN HERE AS AN EQUAL OPTION (PER ENGINEER'S APPROVAL).

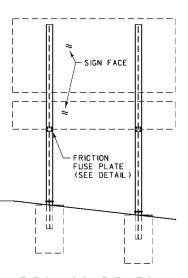
	TABLE OF WE	GHTS				
NOMINAL PIPE DIA.	NOMINAL WEIGHT (kg/m) OF PIPE	WEIGHT OF EACH BREAKAWAY DEVICE & STUB POST (kg)				
75	11.28	12.71				
89	13.56	16. 26				
102	16.06	17.44				
127	21.76	27. 90				
152	28. 23	36.99				

ALL DIMENSIONS ARE MILLIMETERS (mm) UNLESS OTHERWISE NOTED.

DETAILED		
REFERENCE	DWG.	NC
REFERENCE STANDARD SPEC. SECTION 556,619,704	619-	12
SECTION 556, 619, 704	4	

TUBULAR SIGN POST DETAILS





TYPICAL	SIGN	FLEVATION	

DIRECTION OF TRAFFIC

			BASE	CONNEC	TION D	ATA								Fl	JSE PL	ATE DA	ГΑ					FOUN	DATION	DATA	
POST SIZE	BOLT	BOLT							BREAKAWAY	Y DIMENSIONS								BOL T	FUSE DEVICE	FTG.	STUB	FTG.	BAR C	STUB POST	
mm x kg/m	SIZE	TORQUE	Α	В	С	D	E	† <sub>1</sub>	W	(kg)	F	G	Н	J	К	L	N	†3	DIA.	(kg)	DEPTH	LENGTH	DIA.	SIZE	(kg)
W100 x 19 M100 x 19.3	M16 × 70	E4 Nem	215	125	18.6	69.8	27.6	19	8	9.79	95	50.8	28.2	100	57.2	21.4	16.0	10	M16	0. 73	1.1 m	600	0.45 m	#16	11.79
W200 × 27	MIGXIO	34 N-III	320	160	20.3	101.6	29.2	19	8	16.78	115	63.5	31.5	135	69.8	32.6	20.0	13	M20	1.48	1.7 m	750	0.60 m	#22	20.41
W200 × 36	M20 x 89	88 N·m	330	190	19.0	127.0	31.5	25	8	27.61	120	63.5	36.5	150	88.8	30.6	20.0	14	M20	2.11	2.1 m	900	0.60 m	#29	32.66
W310 × 45	M20 x 89	99 N.III	430	190	21.3	127.0	31.5	25	8	35. 63	135	76. 2	38.8	165	88.8	38. 1	22.0	14	M22	2.46	2.4 m	900	0.75 m	#29	40.82
S75 × 8	MI2 × 63	27 N·m	205	75	20.0	38.0	18.5	16	6	4. 70	80	38. 1	29.9	65	38.0	13.5	12.0	6	M12	0. 29	1.1 m	450	0.45 m	#13	3.88
\$100 x 11	7 MIZ X 63	ZIN'M	205	75	20.0	38.0	18.5	16	6	4. 74	80	38. 1	29.9	65	38.0	13.5	12.0	6	M12	0. 29	1.1 m	450	0.45 m	#13	5. 24
S130 x 15	M16 × 70	54 N·m	240	100	18.4	50.8	24.6	19	6	8. 65	80	38. 1	29.9	75	47.6	13.7	12.0	6	M12	0.30	1, 1 m	450	0.45 m	#16	6.80

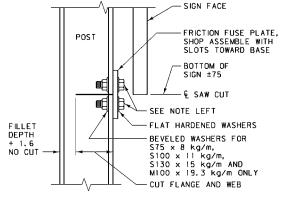
# PROCEDURE FOR BASE CONNECTION ASSEMBLY

- ASSEMBLE POST TO STUB WITH BOLTS AND ONE FLAT WASHER BETWEEN PLATES.
- 2. SHIM AS REQUIRED TO PLUMB POST.
- 3. TIGHTEN BOLTS IN A SYSTEMATIC ORDER TO THE PRESCRIBED TOROUE (SEE TABLE).

300

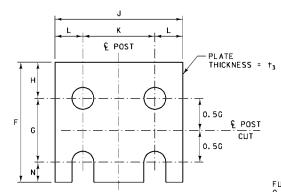
- 4. LOOSEN EACH BOLT AND RETIGHTEN TO PRESCRIBED TORQUE IN THE SAME ORDER AS ORIGINAL TIGHTENING. DO NOT OVERTIGHTEN.
- 5. BURR THREADS AT JUNCTION WITH NUT USING A CENTER PUNCH TO PREVENT NUT LOOSENING.

ALL BOLTS MUST BE ASTM A 325M AND BE TIGHTENED BY USE OF A DIRECT TENSION INDICATING DEVICE (LOAD INDICATING WASHER) IN ACCORDANCE WITH THE MANUFACTURER'S SPECIFICATIONS.



FRICTION FUSE PLATE DETAIL DO NOT USE ON SINGLE POST SIGNS

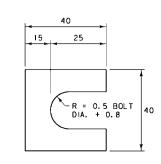
- STUB PROJECTION



HOLE DIAMETER = BOLT DIA. + 1.6

TOP OF FOUNDATION

FRICTION FUSE PLATE DETAIL



FURNISH TWO 0.3 mm ± THICK AND TWO 0.8 mm ± THICK SHIMS PER POST. USE SHIMS FABRICATED FROM BRASS SHIM STOCK OR STRIP CONFORMING TO ASTM B 36M.

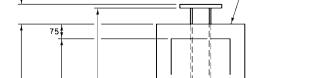
SHIM DETAIL

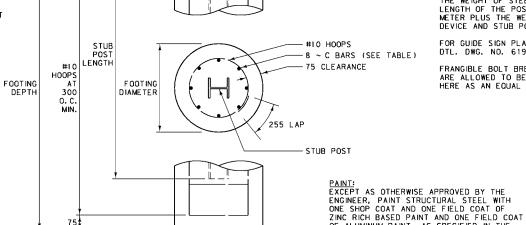
(TYP. BEVEL) 2 BOLTS WITH HEX HEAD, HEX NUT AND 3 HARDENED WASHERS (SEE TABLE FOR BOLT \_ SIGN POST - SIGN POST LENGTH DIA. AND TORQUE) SHIM BETWEEN PLATES TO PLUMB POST R = 0.5 BOLT STUB POST TOP OF FOUNDATION PLATE THICKNESS = +1 STUB POST PROJECTION PAINT ELEVATION SECTION A-A SECTION B-B

NOTE: SECTIONS SHOWN ARE FOR INSTALLATIONS ON RIGHT SHOULDER AND IN GORE. PLATE SLOT BEVELS ARE OPPOSITE HAND FROM THAT SHOWN FOR INSTALLATIONS ON LEFT SHOULDER. DIRECTION OF TRAFFIC 300 2 BOLTS WITH HEX HEAD, HEX NUT AND 3 HARDENED WASHERS (SEE TABLE FOR BOLT (TYP. BEVEL) SIGN DIA. AND TORQUE) LENGTH POST \_SIGN POST SHIM BETWEEN PLATES TO PLUMB POST R = 0.5 BOLT STUB POST -(TYP. BEVEL) 100 STUB 50 300 TOP OF FOUNDATION STUB POST PLATE THICKNESS = +1 ELEVATION SECTION C-C SECTION D-D

SIGN POST AND STUB POST DETAIL "A"

SIGN POST AND STUB POST DETAIL "B" USE ONLY WITH SINGLE POST SIGNS





FOUNDATION DETAIL

OF ALUMINUM PAINT, AS SPECIFIED IN THE STANDARD SPECIFICATIONS, ON ALL SURFACES

NOT IN CONTACT WITH CONCRETE.

USE CLASS "A" OR "D" CONCRETE WITH A WOOD FLOAT FINISH ON TOP. FORM TOP 300 mm OF FOUNDATION.

SEE THE STANDARD SPECIFICATIONS FOR REQUIREMENTS GOVERNING STRUCTURAL STEELS AND THEIR FABRICATIONS. TO AVOID OVERSIGHT, NOTE THESE REQUIREMENTS ON THE SHOP DRAWINGS.

SUBMIT SHOP PLANS FOR APPROVAL BEFORE FABRICATION IS BEGUN.

THE WEIGHT OF STEEL POSTS IS COMPUTED BY TAKING THE LENGTH OF THE POST TIMES THE NOMINAL WEIGHT PER METER PLUS THE WEIGHT OF THE BREAKAWAY DEVICE, FUSE DEVICE AND STUB POST AS SHOWN IN THE TABLE.

FOR GUIDE SIGN PLACEMENT AND DETAILS, SEE SIGNING DTL. DWG. NO. 619-08.

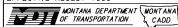
FRANGIBLE BOLT BREAKAWAY SYSTEMS APPROVED BY FHWA ARE ALLOWED TO BE USED IN PLACE OF THE DESIGN SHOWN HERE AS AN EQUAL OPTION (PER ENGINEER'S APPROVAL).

ALL DIMENSIONS ARE MILLIMETERS (mm) UNLESS OTHERWISE NOTED.

DETAILED DRAWING
REFERENCE DWG.
STANDARD SPEC. 619 DWG. NO. 619-13 SECTION 619

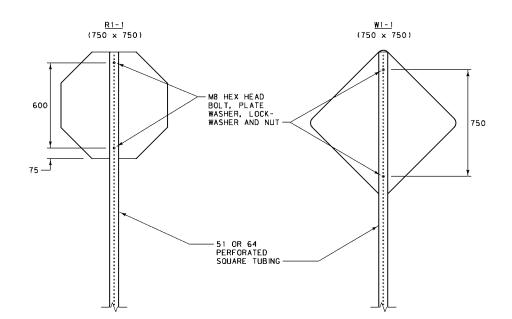
BREAKAWAY AND FOUNDATION DETAILS FOR MULTIPLE

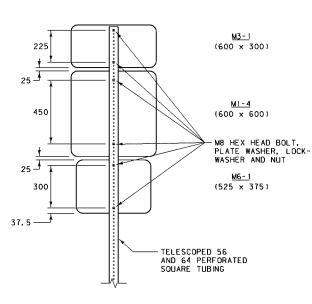
GUIDE SIGN SUPPORTS

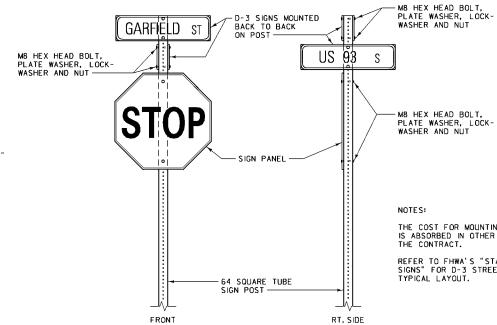


# SIGNS WITHOUT BACKBRACING (SEE PLANS FOR BACKBRACING REQUIREMENTS)

# STREET NAME SIGN INSTALLATION







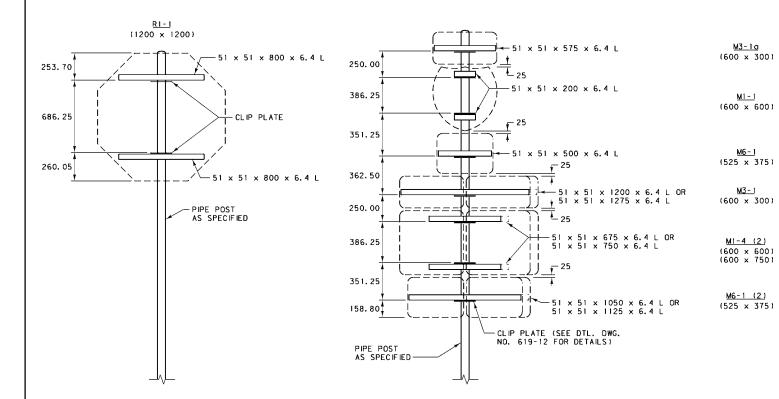
NOTES: THE COST FOR MOUNTING D-3 SIGNS IS ABSORBED IN OTHER BID ITEMS OF

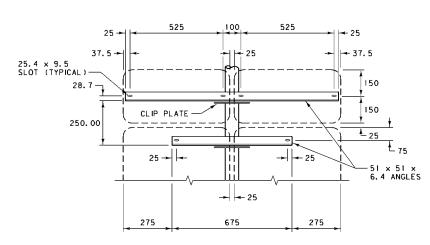
REFER TO FHWA'S "STANDARD HIGHWAY SIGNS" FOR D-3 STREET NAME SIGN TYPICAL LAYOUT.

# SIGNS WITH BACKBRACING (SEE PLANS FOR BACKBRACING REQUIREMENTS)

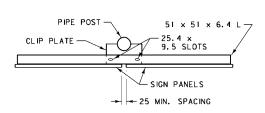
# TYPICAL MOUNTING DETAILS (FOR 75 mm DIA. AND LARGER PIPE)

# **ELEVATION**





# PLAN VIEW



ALL DIMENSIONS ARE MILLIMETERS (mm) UNLESS OTHERWISE NOTED.

# NOTES:

VERTICAL DIMENSIONS SHOWN ARE FROM TOP TO TOP OF ALL POST CLIP PLATES.

PLACE A SUITABLE WATERTIGHT CAP ON TOP OF ALL PIPE POSTS.

BREAKAWAY DEVICES FOR SQUARE TUBING ARE SHOWN ON DTL. DWG. NO. 619-14.

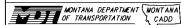
CONFORM MATERIAL USED IN FABRICATION OF POST CLIPS AND ANGLE BRACKETS TO SECTION 556 OF THE STANDARD SPECIFICATIONS.

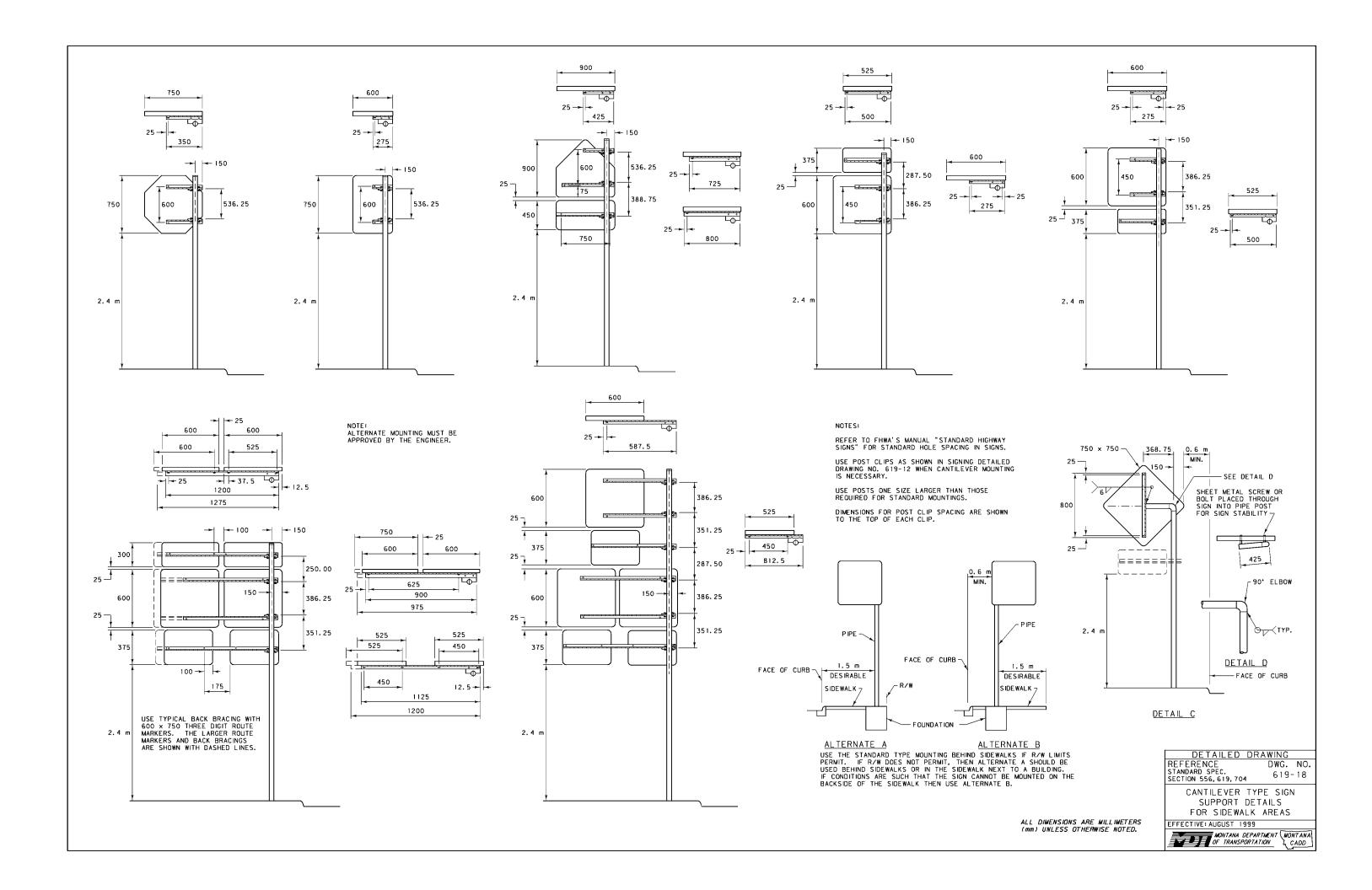
THE LENGTH OF EACH ANGLE BRACKET DEPENDS ON THE MOUNTING ASSEMBLY AND HOLE SPACING OF EACH SIGN. THE ASSEMBLIES SHOWN ARE TYPICAL INSTALLATIONS. ERECT SIMILAR ASSEMBLIES IN A LIKE MANNER.

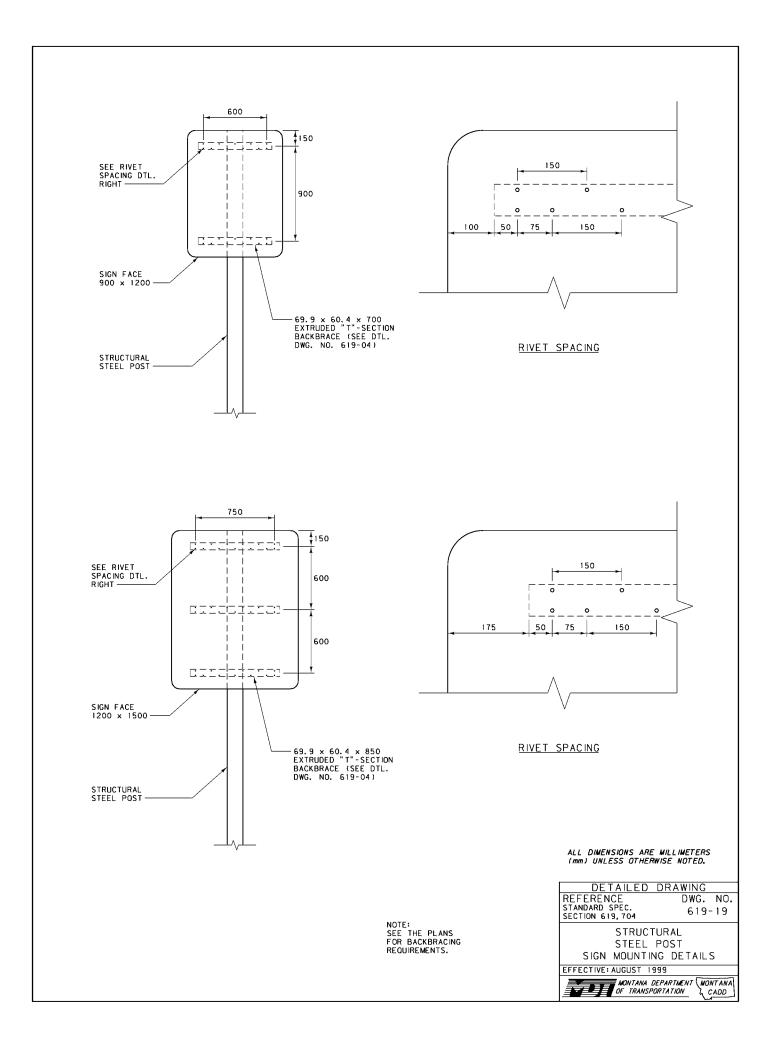
REFER TO FHWA'S "STANDARD HIGHWAY SIGNS" FOR STANDARD HOLE SPACING IN SIGNS.

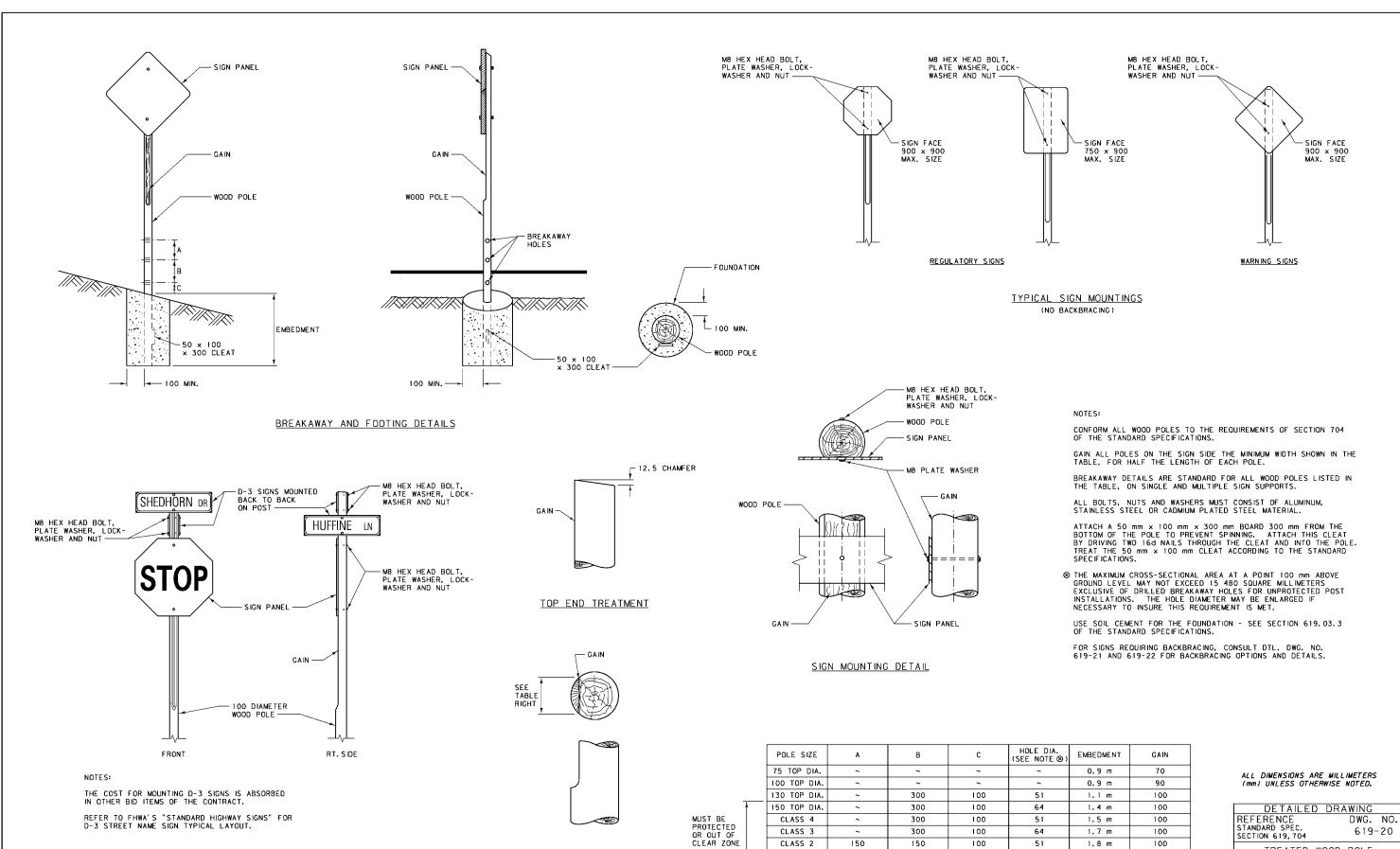
DETAILED DRAWING REFERENCE STANDARD SPEC. DWG. NO. 619-16 SECTION 556, 619, 704

> TYPICAL STEEL POST MOUNTING DETAILS









GAIN DETAIL

STREET NAME SIGN INSTALLATION

CLASS 2

CLASS 1

150

150

150

150

100

100

51

64

1.8 m

2.0 m

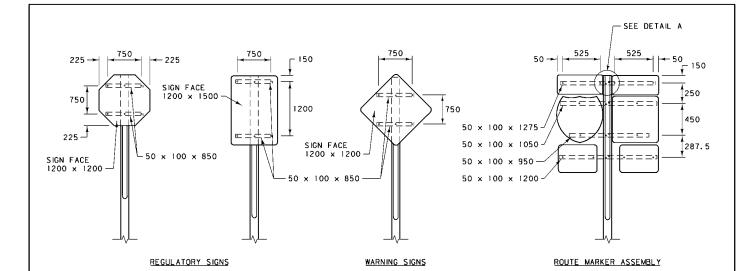
100

100

SECTION 619, 704

TREATED WOOD POLE SIGN MOUNTING AND SUPPORT DETAILS



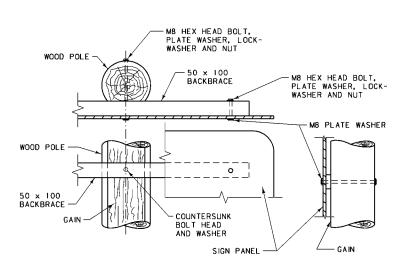


WOOD BACKBRACE INSTALLATIONS

NOTE:

SIGNS OF THESE SIZES AND LARGER REQUIRE WOOD BACKBRACING.

SMALLER SIGNS MAY REQUIRE BACKBRACING IF THE CONDITIONS WARRANT (SEE SIGNING PLANS). IN THIS CASE, THE CONTRACTOR HAS THE OPTION OF USING WOOD OR STEEL BACKBRACING (SEE DTL. DWG. NO. 619-22).

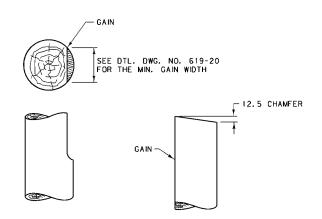


# M8 HEX HEAD BOLT, PLATE WASHER, LOCKWASHER AND NUTS TO MIN. TO MIN.

DETAIL A (BACKBRACE)

50 MIN.

# SIGN MOUNTING DETAIL



TOP END TREATMENT

GAIN DETAIL

NOTES:

(mm) UNLESS OTHERWISE NOTED.

CONFORM ALL WOOD POLES TO THE REQUIREMENTS OF SECTION 704 OF THE STANDARD SPECIFICATIONS.

GAIN ALL POLES ON THE SIGN SIDE THE MINIMUM WIDTH SHOWN IN THE TABLE ON DTL. DWG. NO. 619-20, FOR HALF THE LENGTH OF EACH POLE.

USE 50 mm x 100 mm \$4\$ LUMBER FOR ALL WOOD BACK-BRACING, CONFORMING TO THE REQUIREMENTS OF SECTION 704 OF THE STANDARD SPECIFICATIONS.

ALL BOLTS, NUTS AND WASHERS MUST CONSIST OF ALUMINUM, STAINLESS STEEL OR CADMIUM PLATED STEEL MATERIAL.

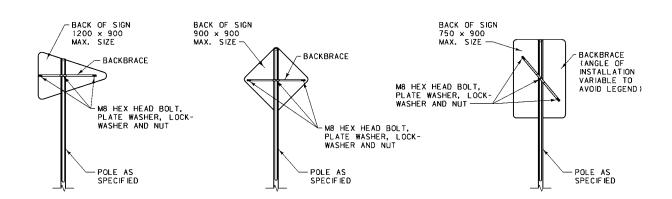
SEE DTL. DWG. NO. 619-20 FOR BREAKAWAY AND SUPPORT DETAILS.

	DRAWING				
REFERENCE STANDARD SPEC. SECTION 619,704	DWG. NO.				
SECTION 619, 704	619-21				



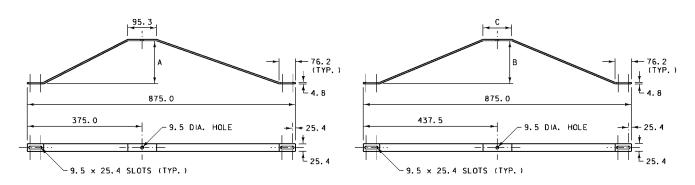
TREATED WOOD POLE
SIGN MOUNTING DETAILS

EFFECTIVE: AUGUST 1999



NO PASSING PENNANTS WARNING SIGNS REGULATORY SIGNS

# STEEL BACKBRACE INSTALLATIONS

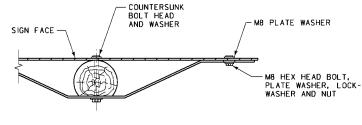


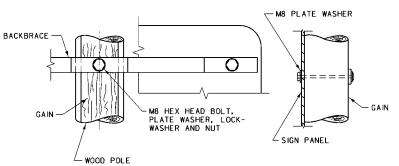
NO PASSING PENNANTS

# REGULATORY AND WARNING SIGNS

# STEEL BACKBRACE DETAILS

POLE DIA.	A	В	С		
75	54.0	54.0	95.3		
100	76.2	76. 2	95.3		
130	1	101.6	108.0		
150	1	133.4	108.0		





SIGN MOUNTING DETAIL

ALL DIMENSIONS ARE MILLIMETERS (mm) UNLESS OTHERWISE NOTED.

# NOTES:

USE COMMERCIAL QUALITY, MILD STEEL, HOT-DIPPED AFTER FABRICATION. GALVANIZE ACCORDING TO THE SPECIFICATIONS OF AASHTO M 111.

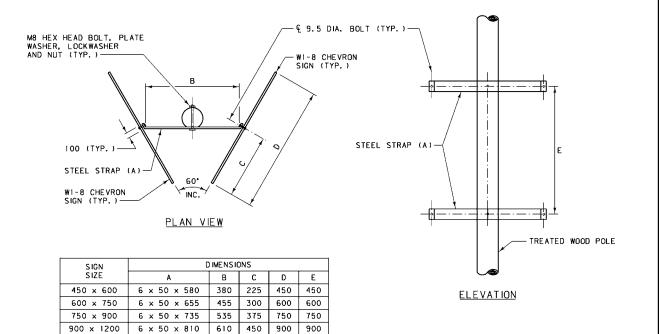
SEE DTL. DWG. NO. 619-21 FOR APPLICATIONS OF THIS TYPE OF BRACE AND ADDITIONAL SIGN MOUNTING REQUIREMENTS.

SEE DTL. DWG. NO. 619-20 FOR BREAKAWAY AND SUPPORT DETAILS.

DETAILED DRAWING
REFERENCE DWG. NO.
STANDARD SPEC. 619-22

TREATED WOOD POLE OPTIONAL BACKBRACE



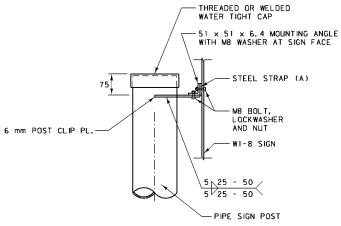


# WOOD POST MOUNTING

MOUNT 2 CHEVRON SIGNS ON EACH POST WITH EACH PANEL ADJUSTED TO APPROXIMATE RIGHT ANGLE TO ROADWAY CENTERLINE. EXACT LOCATION AND ANGLE TO BE DETERMINED BY ENGINEER.



WI-8 CHEVRON ALIGNMENT SIGNS
MAY BE USED AS AN ALTERNATE OR
AS A SUPPLEMENT TO DELINEATION
TO PROVIDE ADDITIONAL EMPHASIS
AND GUIDANCE WHEN A CHANGE IN
HORIZONTAL ALIGNMENT EXISTS IN
THE ROADWAY.



# NOTES:

INSTALL CHEVRONS WITH A MINIMUM 3.1 m HORIZONTAL CLEARANCE AND A 1.5 m VERTICAL MOUNTING HEIGHT.

SPACING FOR DESIGN PURPOSES IS DOUBLE THE SPACING SHOWN IN THE TABLE ON DTL. DWG. NO. 619-36, UP TO A MAXIMUM CHEVRON SPACING OF 60  $\pi$ . A MINIMUM OF 3 VISIBLE CHEVRONS ARE REQUIRED THROUGH A CURVE.

FIELD INSPECT THE CHEVRONS AT NIGHT AND ADJUST THEIR LOCATIONS TO ACHIEVE 150 m OF VISIBILITY.

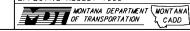
# STEEL PIPE MOUNTING

DETAILED DRAWING
REFERENCE DWG. NO.
STANDARD SPEC. 619-24

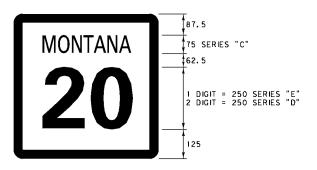
CHEVRON MOUNTING DETAILS

ALL DIMENSIONS ARE MILLIMETERS
(mm) UNLESS OTHERWISE NOTED.

EFFECTIVE: AUGUST 1999



# <u>PANELS</u> FOR USE ON ROUTE MARKER ASSEMBLIES



<u>M1-5</u>

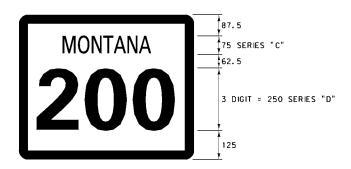
600 × 600

MARGIN = NONE

BORDER = 37.5

CORNER RADIUS = 37.5

BLACK LEGEND AND BORDER ON A RETRO-REFLECTORIZED WHITE BACKGROUND.



<u>M1 - 5</u>

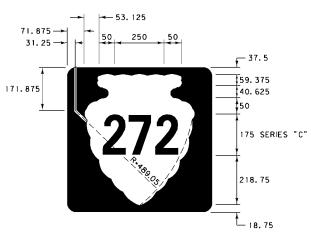
 $750 \times 600$ 

MARGIN = NONE

BORDER = 37.5

CORNER RADIUS = 37.5

BLACK LEGEND AND BORDER ON A RETRO-REFLECTORIZED WHITE BACKGROUND.



<u>M1 - 10</u>

600 × 600

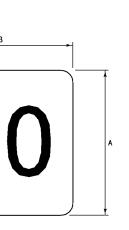
MARGIN = NONE

BORDER = SEE DESIGN ABOVE

CORNER RADIUS = 37.5

BLACK LEGEND AND BORDER ON A RETRO-REFLECTORIZED WHITE BACKGROUND.

SHIELDS FOR USE ON GUIDE SIGNS



		250 mm	NUMERALS	300 mm	NUMERALS	450 mm	NUMERALS
		2 DIGIT	3 DIGIT	2 DIGIT	3 DIGIT	2 DIGIT	3 DIGIT
	A	525	525	600	600	900	900
	В	600	750	600	750	900	1125
	J	150	150	162.5	162.5	237.5	237.5
	R	37.5	37.5	50	50	62.5	62.5

BLACK LEGEND ON A RETRO-REFLECTORIZED WHITE BACKGROUND WITH NO BORDER.

SERIES "D" NUMERALS

∳E √ ‡G Å SERIES "C" NUMERALS

														RA	.DII	
		A	В	С	D	E	F	G	Н	J	K	L	RΙ	R 2	R 3	R 4
*	200 mm NUMERALS	650	700	462.5	65.625	75	7.8125	50	137.5	275	425	56. 25	800	43.75	15.625	7.8125
**	250 mm NUMERALS	800	850	562.5	81.25	90.625	9.375	62.5	168.75	343.75	512.5	50	962.5	50	18.75	9.375
***	300 mm NUMERALS	1000	1050	700	100	112.5	12.5	75	210.9375	425	625	71.875	1200	62.5	25	12.5

BLACK LEGEND ON A RETRO-REFLECTORIZED WHITE BACKGROUND.

- \* USE WITH STANDARD 600 mm U.S. SHIELD.
- \*\* USE WITH STANDARD 750 AND 900 mm U.S. SHIELD.
- \*\*\* USE WITH STANDARD 1050 mm U.S. SHIELD AND ALL INDEPENDENT USE.

# NOTES:

CENTER ALL NUMERALS USED ON PANELS AND SHIELDS OPTICALLY ABOUT VERTICAL CENTERLINE.

SEE SIGNS AND SIGNING MATERIALS CATALOG FOR COMPLETE LISTING OF SIGNS AND SIGN SIZES. DESIGNS ARE AVAILABLE FROM THE TRAFFIC UNIT FOR SIGNS UNIQUE TO MONTANA.

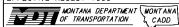
ALL DIMENSIONS ARE MILLIMETERS (mm) UNLESS OTHERWISE NOTED.

DETAILED DRAWING
REFERENCE
STANDARD SPEC.
SECTION 619

DRAWING
619

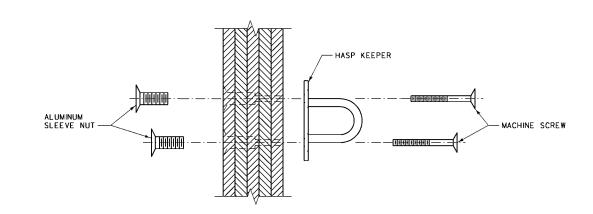
DWG. NO. 619-26

SPECIAL DESIGN ROUTE MARKER PANELS AND SHIELDS



# ALUMINUM SHEET MOUNTING

# - DRIVE RIVET



2.5 ALUMINUM SIGN PANEL

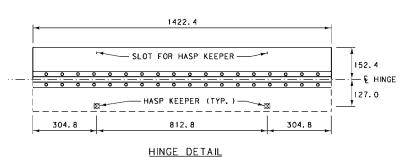
mm ALUMINUM SHIM

- 19 HIGH DENSITY PLYWOOD SIGN PANEL

CONTINUOUS HINGE

- PULL THRU RIVET

PLYWOOD MOUNTING



<u>EXAMPLE</u> (1650 x 1200 D8-2A WEIGH STATION SIGN SHOWN)

**MAJOR** 

SIGN

**PANEL** 

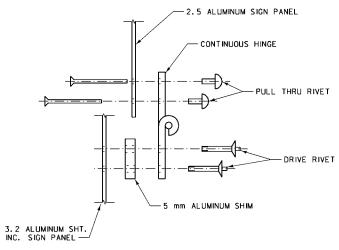
**CLOSED** 

200 mm UPPER CASE

SERIES "E" MODIFIED

200 mm UPPER CASE SERIES "E" MODIFIED

- HINGE



# NOTES:

SEE SIGNS AND SIGNING MATERIALS CATALOG FOR COMPLETE LISTING OF SIGNS AND SIGN SIZES. DESIGNS ARE AVAILABLE FROM THE TRAFFIC UNIT FOR SIGNS UNIQUE TO MONTANA.

THE SIGN PANEL CONSISTS OF 19 mm HIGH DENSITY PLYWOOD OR 3.2 mm ALUMNUM SHEET INCREMENT AS SPECIFIED ON THE PLANS. THE HINGED PANEL CONSISTS OF 2.5 mm SHEET ALUMINUM.

PAINT ALL HARDWARE VISIBLE ON THE SIGN FACE OR COVER WITH RETRO-REFLECTIVE SHEETING, THE SAME COLOR AS THE SIGN.

SUBMIT SHOP DRAWINGS FOR APPROVAL PRIOR TO FABRICATION.

SUPPLEMENTAL SIGN PANEL BELOW MAJOR SIGN PANEL MUST HAVE RETRO-REFLECTORIZED LEGEND AND BACKGROUND MATCHING COLORS OF MAJOR PANEL.

THE MINIMUM MOUNTING HEIGHT TO THE BOTTOM OF THE SECONDARY PANEL IS 1.5 m.

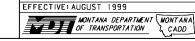
DETAILED DRAWING
REFERENCE DWG.
STANDARD SPEC.
SECTION 619, 704

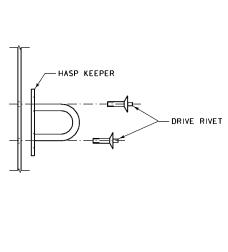
DRAWING
619 DWG. NO. 619-30

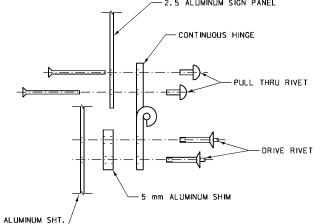
- MACHINE BOLT

SIGN HINGE DETAILS

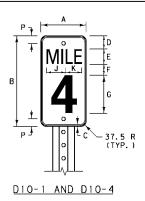
ALL DIMENSIONS ARE MILLIMETERS (mm) UNLESS OTHERWISE NOTED.

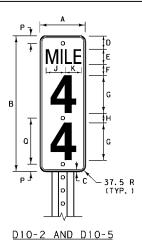


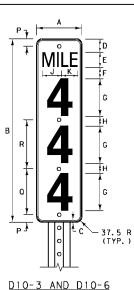


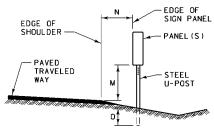


ALUMINUM









DIMENSION	INTERSTATE	NON-INTERSTATE
М	1.2 m	1.2 m
N	1.8 m	0.6 m TO 1.8 m *
0	0.6 m MIN.	0.6 m MIN.

\* NORMALLY IN LINE WITH DELINEATORS

PANEL DIMENSION INFORMATION

TYPICAL PLACEMENT

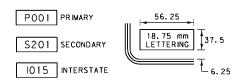
INTERSTATE								
DIMENSION	D10-4 (1 DIGIT)	D10-5 (2 DIGIT)	D10-6 (3 DIGIT)					
Α	300	300	300					
В	600	900	1200					
С	12.5	12.5	12.5					
D	87.5	75	75					
E	100 SERIES "C"	100 SERIES "C"	100 SERIES "C"					
F	75	75	75					
G ⊛	250 SERIES "C"	250 SERIES "C"	250 SERIES "C"					
Н	~	75	62.5					
J	115	115	115					
K	120	120	120					
Р	50	50	50					
0	~	325	300					
R	~	~ 325						

NON-INTERSTATE								
DIMENSION	D10-1 (1 DIGIT)	D10-2 (2 DIGIT)	D10-3 (3 DIGIT)					
Α	250	250	250					
В	450	675	900 12.5					
С	12.5	12.5						
D	50	50	50					
E	100 SERIES "B"	100 SERIES "B"	100 SERIES "B"					
F	50	50	50					
G ⊕	150 SERIES "C"	150 SERIES "C"	150 SERIES "C"					
Н	~	75	75 90 95 37. 5 250					
J	90	90						
К	95	95						
Р	37.5	37.5						
٥	~	250						
R	~	~	225					

S OPTICALLY CENTER DIGITS ON VERTICAL € OF PANEL.

WASHER -STEEL OR RIVET WASHER SINGLE PANEL DOUBLE PANEL

# TYPICAL PANEL MOUNTING



ROUTE IDENTIFICATION STICKERS ON NEW SIGNING PROJECTS, FURNISH AND PLACE ROUTE NUMBER IDENTIFICATION STICKERS UPON BACKS OF ALL SIGNS BEFORE FINAL ACCEPTANCE OF THE PROJECT.

PLACE THE STICKER DISPLAYING THE FEDERAL AID ROUTE NUMBER IN THE LOWER LEFT CORNER OF THE REFERENCE POST SIGN, NEAREST THE EDGE OF THE ROADWAY.

# NOTES:

REFERENCE POST PANELS CONSIST OF A RETRO-REFLECTORIZED WHITE LEGEND AND BORDER ON A RETRO-REFLECTORIZED GREEN

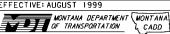
MOUNT ALL REFERENCE POSTS ON STEEL U-POSTS (MIN. 3 kg/m) EXCEPT THE DIO-6, WHICH IS MOUNTED ON A STEEL U-POST (MIN. 4.5 kg/m) AS NOTED IN THE SIGNING PLANS.

USE GALVANIZED OR CADMIUM PLATED MB BOLT, NUT AND WASHER, AND JAM THREADS AFTER TIGHTENING. USE 8 mm DIA. ALUMINUM OR CADMIUM PLATED BOLT RIVETS OR PAINT RIVET HEADS WITH BRILLIANT GREEN SIGN ENAMEL.

DO NOT RELOCATE OR MOVE A REFERENCE POST ONCE IT HAS BEEN PROPERLY PLACED.

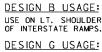
DETAILED	DRAWING
REFERENCE	DWG. NO.
STANDARD SPEC. SECTION 619	619-32
REFERENCE PO	ST DETAILS
EFFECTIVE: AUGUST 19	199

ALL DIMENSIONS ARE MILLIMETERS (mm) UNLESS OTHERWISE NOTED.



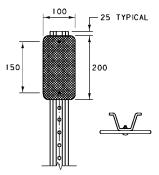
DESIGN A USAGE: USE FOR CONTINUOUS DELINEATION AND RT. SHOULDER OF ALL ROUTES.

DESIGN H USAGE: USE ON LT. SHOULDER OF INTERSTATE ROUTES.



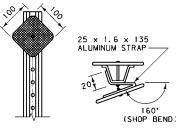
USE ON RT. SHOULDER OF INTERSTATE RAMPS.

DESIGN J USAGE: USE FOR TRUCK ESCAPE RAMPS ONLY.



DESIGN B (YELLOW) DESIGN G (WHITE) DESIGN J (RED)

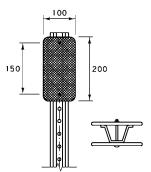
DESIGN C USAGE: USE FOR CURVES WITH RADII 170 m OR LESS, BOTH OUTSIDE AND



DESIGN C (WHITE)

DESIGN D USAGE: NON-INTERSTATE ROUTES: USE AT APPROACHES WITH STOP OR YIELD SIGNS. INTERSTATE ROUTES:
USE FOR RAMP TERMINATION AT CROSS ROAD.

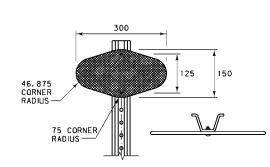
DESIGN A (WHITE)
DESIGN H (YELLOW)



DESIGN D (YELLOW)

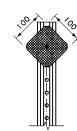
DELINEATOR LEGEND

DESIGN E USAGE: SPECIAL USE ONLY. FORMERLY USED AT GORES AND ISLAND NOSES.



DESIGN E (YELLOW)

DESIGN F USAGE: USE FOR CURVES WITH RADII GREATER THAN 170 m; 450 m TO 231 m RADIUS: OUTSIDE ONLY, 230 m TO 171 m RADIUS: OUTSIDE AND INSIDE OF CURVE.



DESIGN F (WHITE)

DESIGN "A"	$\dashv$
DESIGN "B"	<b>—</b>
DESIGN "C"	<b>V</b>
DESIGN "D"	⊩
DESIGN "E"	
DESIGN "F"	Н
DESIGN "G"	$\prec$
DESIGN "H"	→
DESIGN "J"	<b>→</b> ×

SOME TYPICAL USES ARE SHOWN FOR EACH DESIGN. REFER TO THE MUTCD FOR SPECIFIC GUIDANCE.

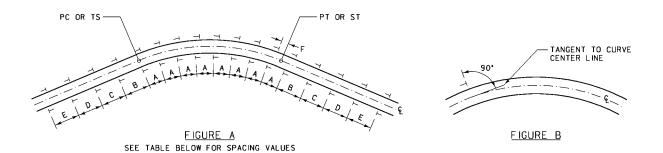
ALL DIMENSIONS ARE MILLIMETERS (mm) UNLESS OTHERWISE NOTED.

DETAILED	DRAWING
REFERENCE	DWG. NO
REFERENCE STANDARD SPEC. SECTION 619	619-34
SECTION 619	

DELINEATOR DETAILS







HORIZONTAL CURVE SPACING TABLE								
RADIUS, m	SPACING ON CURVE, m							
	A	В	С	D	E			
1750 & UP	90	120	120	120	120			
900 - 1749	65	120	120	120	120			
600 - 899	50	95	120	120	120			
450 - 599	40	75	120	120	120			
300 - 449	35	65	100	120	120			
200 - 299	25	55	80	120	120			
150 - 199	20	45	70	90	120			
100 - 149	20	35	55	90	120			
0 - 99	15	25	40	80	120			

# NOTES:

FURNISH RETRO-REFLECTIVE SHEETING ACCORDING TO THE STANDARD SPECIFICATIONS FOR RETRO-REFLECTIVE SHEETING B (HIGH INTENSITY). POSITION DELINEATOR FACES PERPENDICULAR TO TANGENT TO CENTERLINE OF CURVE AS SHOWN IN FIGURE B.

MOUNT DELINEATORS ON METAL U-POSTS (MIN. 1.7 kg/m) WITH 5 mm DIA. CADMIUM PLATED BOLT(S). DRILL OR PUNCH A MINIMUM OF TWELVE 9.5 mm MAXIMUM DIAMETER HOLES ON 25 mm CENTERS FROM THE TOP OF THE POST. 6.4 mm SOUARE HOLES MAY BE USED. IF SOUARE HOLES ARE USED, USE A LARGE HEADED BOLT OR AN APPROPRIATE WASHER. JAM THREADS AFTER TIGHTENING THE NUT TO PREVENT REMOVAL.

PLACE DELINEATORS AT A CONSTANT CLEARANCE DISTANCE FROM THE EDGE OF THE PAVEMENT EXCEPT WHERE GUARDRAIL OR OTHER OBSTRUCTIONS INTERFERE. ALIGN THE DELINEATORS WITH THE INSIDE EDGE OF THE OBSTRUCTION. CLEARANCE FOR DELINEATORS IS 1.8 m ON INTERSTATE HIGHWAYS, 0.6 m TO 1.8 m ON PRIMARY AND SECONDARY HIGHWAYS OR AS DETERMINED BY THE ENGINEER. THE STANDARD MOUNTING HEIGHT IS 1.2 m TO THE TOP OF THE POST. SUPPLY POST LENGTHS TO MAINTAIN THE PROPER MOUNTING HEIGHT AND A MINIMUM OF 0.45 m EMBEDMENT.

SPACE DELINEATORS ACCORDING TO THE DISTANCES FOUND IN THE TABLE ABOVE OR AS SPECIFIED IN THE PLANS. IN FIGURE A, IF "F" IS GREATER THAN 6 m ADD ONE REGULAR DELINEATOR IN AT "A" SPACING. UNDER NORMAL SPACING, SHOULD A DELINEATOR FALL WITHIN A CROSSROAD OR APPROACH, IT MAY BE MOVED IN EITHER DIRECTION A DISTANCE NOT TO EXCEED ONE OUARTER OF THE NORMAL SPACING. ELIMINATE DELINEATORS STILL FALLING IN SUCHAPEAS

ALL DELINEATOR REFLECTORS HAVE 18.75 mm CORNER RADII EXCEPT DESIGN "E".

MOUNT THE DELINEATOR REFLECTOR 25 mm BELOW THE TOP OF THE METAL U-POST.

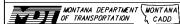
WHEN THE ROADWAY ADT IS LESS THAN 900, DELINEATE ALL CURVES WITH 450 METER RADIIOR LESS.

CONTINUOUSLY DELINEATE ROADWAYS WHEN THE ADT IS 900 AND GREATER, OR BY ENGINEERING JUDGEMENT.

DETAILED DRAWING
REFERENCE DWG. NO.
STANDARD SPEC.
SECTION 619, 704

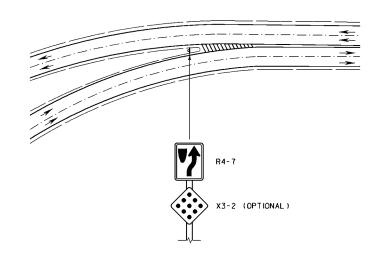
DRAWING
619-36

DELINEATOR PLACEMENT DETAILS



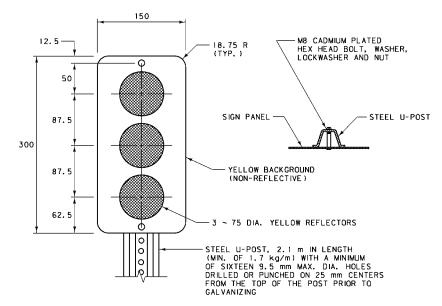
<u>TYPE 1</u> x3-2

NOTE:
TYPE I OBJECT MARKERS HAVE YELLOW REFLECTORS ON A YELLOW
OR BLACK BACKGROUND OR AN ALL YELLOW RETRO-REFLECTORIZED
PANEL OF THE SAME SIZE. IF USED AS END OF ROAD MARKERS,
TYPE I MARKERS ARE RETRO-REFLECTORIZED RED OR HAVE RED
REFLECTORS ON A RED OR BLACK BACKGROUND.



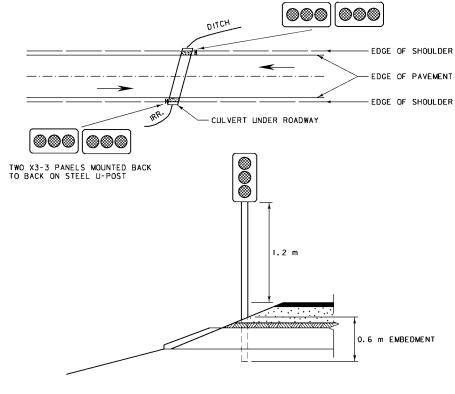
TYPICAL USE AND PLACEMENT
PLACEMENT OF X3-2 IS USED ONLY
AS OPTIONAL TO ENHANCE TARGET
VALUE WHEN NEEDED.

# <u>TYPE 2</u> x3-3



ALTERNATE DESIGN FOR TYPE 2 OBJECT MARKERS IS A YELLOW RETRO-REFLECTORIZED PANEL OF THE SAME SIZE.

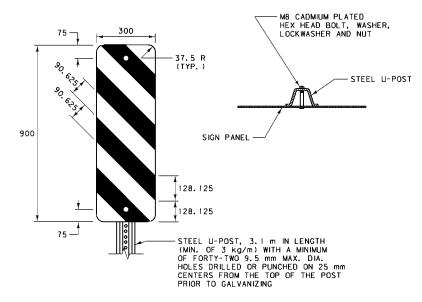
TWO X3-3 PANELS MOUNTED BACK TO BACK ON STEEL U-POST

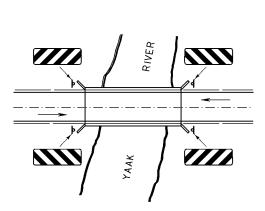


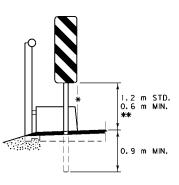
PLACE POST AND PANEL(S) SO THAT PANEL(S) ARE DIRECTLY ADJACENT TO INNER-MOST EDGE OF OBJECT NEAREST TRAVELED WAY.

TYPICAL USE AND PLACEMENT

# TYPE 3 OM-3 (OM-3L SHOWN)





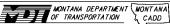


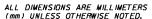
- \* PLACE POST AND PANEL SO THAT PANEL EDGE IS FLUSH WITH FACE OF OBJECT NEAREST TRAVELED WAY.
- \*\* WHEN MOUNTED 2.4 m OR MORE FROM CURB OR SHOULDER, THE MOUNTING HEIGHT IS MEASURED FROM THE GROUND LINE INSTEAD OF THE EDGE OF PAVEMENT.

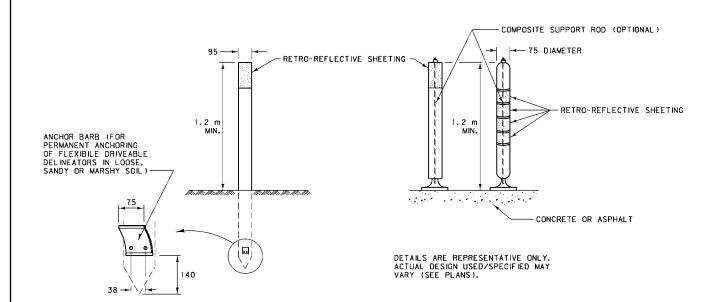
# TYPICAL USE AND PLACEMENT

DETAILED DRAWING
REFERENCE DWG. NO.
STANDARD SPEC.
SECTION 619 619-38

OBJECT MARKER DESIGN AND
PLACEMENT DETAILS FOR OBSTRUCTIONS
ADJACENT TO OR WITHIN HIGHWAYS







FLEXIBLE DRIVEABLE

**DELINEATORS** 

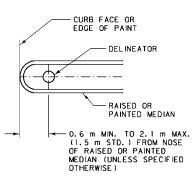
FLEXIBLE SURFACE-MOUNTED **DELINEATORS** 

USE FLEXIBLE DELINEATORS SIMILAR TO THE DESIGN AND SPECIFICATIONS SHOWN ON THIS SHEET OR IN THE SIGNING PLANS OF THE CONTRACT.

MOUNT OR EMBED FLEXIBLE DELINEATORS TO THE MANUFACTURER'S SPECIFICATIONS.

RETRO-REFLECTORIZE FLEXIBLE DELINEATORS, IF REDUIRED IN PLAN SPECIFICATIONS, BY THE ADDITION OF DELINEATOR CRYSTALS, EITHER 37.5 mm x 175 mm OR 75 mm DIAMETER, OR BY ADDING TWO 75 mm MINIMUM WIDTH BANDS OF RETRO-REFLECTIVE SHEETING TYPE HI, 360° AROUND THE TOP OF THE DELINEATOR. USE THE COLOR OF THE DELINEATOR. RETRO-REFLECTORIZED MATERIAL AS SHOWN IN THE SIGNING PLANS OF THE CONTRACT OR THE MUTCD.

THE EXACT LOCATION AND PLACEMENT OF THE FLEXIBLE DELINEATORS ARE SHOWN IN THE SIGNING PLANS.

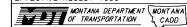


TYPICAL USE AND PLACEMENT

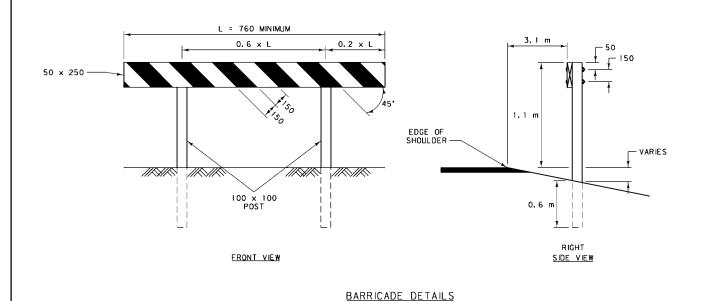
DETAILED DRAWING
REFERENCE DWG.
STANDARD SPEC.
SECTION 619 619 DWG. NO. 619-40

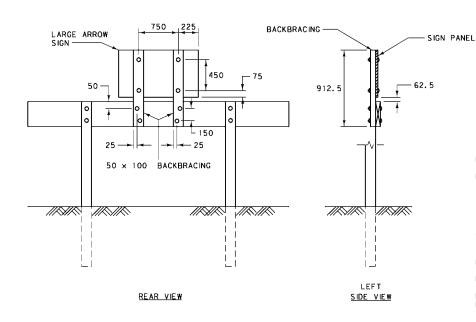
FLEXIBLE DELINEATORS

ALL DIMENSIONS ARE MILLIMETERS EFFECTIVE: AUGUST 1999 (mm) UNLESS OTHERWISE NOTED.



# BIBARRICADE B(I)-L SHOWN





SIGN MOUNTING DETAILS

# NOTES:

CONSTRUCT ALL BARRICADES OF COMMERCIAL GRADE S4S LUMBER. USE MIO GALVANIZED CARRIAGE OR CADMIUM PLATED BOLTS, WASHERS AND NUTS FOR ALL CONNECTIONS.

PAINT ALL BARRICADES WITH TWO COATS OF WHITE PAINT IN ACCORDANCE WITH SECTION 710 OF THE STANDARD SPECIFICATIONS.

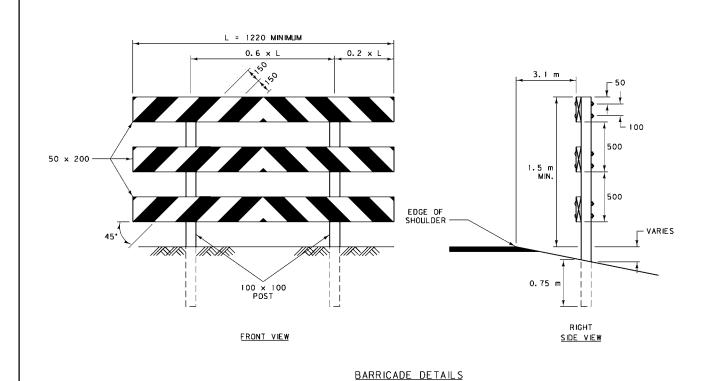
ALL BARRICADES HAVE ALTERNATING RETRO-REFLECTIVE RED AND WHITE STRIPES, 150 mm in Width at an angle of 45° to the vertical, slanting downward toward the side or sides on which traffic is to flow. Nominal dimensions of roll material for stripes is acceptable.

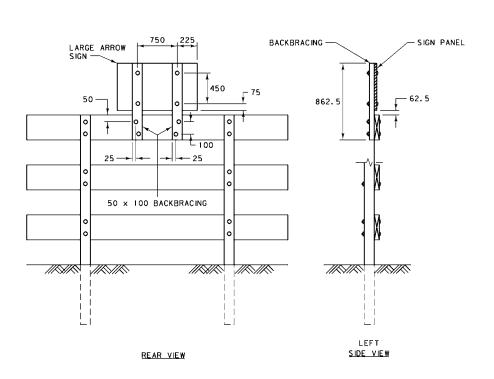
BARRICADES DESIGNATED "L" ARE PLACED ON THE LEFT SIDE OF APPROACHING TRAFFIC. BARRICADES DESIGNATED "R" ARE PLACED ON THE RIGHT SIDE OF APPROACHING TRAFFIC.

RETRO-REFLECTORIZE ALL BARRICADES WITH THE SHEETING MOUNTED ON A SHEET ALUMINUM BACKING AT LEAST 0.5 mm THICK. USE ALUMINUM ALLOY 6061-T6 OR AA5052-H38 CONFORMING TO ASTM DESIGNATION B 209M. SECURE RETRO-REFLECTIVE ALUMINUM SHEETING WITH ALUMINUM NAILS.

DETERMINE THE POST LENGTHS IN THE FIELD, COMPLYING WITH THE MOUNTING HEIGHTS AND FOUNDATION DEPTHS LISTED ON THIS SHEET.

# BIII BARRICADE B(III)-L & R SHOWN





SIGN MOUNTING DETAILS

ALL DIMENSIONS ARE MILLIMETERS (mm) UNLESS OTHERWISE NOTED.

DETAILED DRAWING
REFERENCE DWG. NO.
STANDARD SPEC.
SECTION 619

DRAWING
619-42

PERMANENT BARRICADE DESIGN DETAILS



